UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/356,260	07/16/1999	ALFONS EIZENHOEFER	7-2-1	7579

49472 7590 07/05/2006

AGERE
LERNER, DAVID et al.
600 SOUTH AVENUE WEST
WESTFIELD, NJ 07090

EXAMINER	
THANGAVELU, KANDASAMY	
ART UNIT	**PAPER NUMBER**
2123	

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

MAILED

JUL - 5 2006

Technology Center 2100

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09356260
Filing Date: July 16, 1999
Appellant(s): EIZENHOEFER et al..

Richard Bots
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on May 15, 2006 appealing from the Office action mailed on December 7, 2005.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The Appellants' statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be reviewed on Appeal

A statement of the grounds of rejection to be reviewed on appeal is contained in the brief.

In response to the Appellants' Arguments, the Examiner has withdrawn the claim rejections under 35 USC 112 First Paragraph.

1. Whether claims 20-22, 25, 29, and 32-34 are unpatentable under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,418,558 to Roberts et al. in view of U.S. Patent No. 6,014,374 to Paneth et al.

2. Whether claims 23, 24, 31, 37, and 38 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Roberts et al. in view of Paneth et al. and further in view of U.S. Patent No. 6,134,220 to Le Strat et al.

3. Whether claims 26-28 are unpatentable under 35 U.S.C. § 103(a) over Roberts et al. in view of Paneth et al. and further in view of U.S. Patent No. 5,199,031 to Dahlin et al.

4. Whether claims 30 and 35 are unpatentable under 35 U.S.C. § 103(a) over Roberts et al. in view of Paneth et al. and further in view of U.S. Patent No. 6,385,460 to Wan.

5. Whether claim 36 is unpatentable over Roberts et al. in view of Paneth et al. in view of Wan and further in view of Le Strat et al.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

U.S. Patent No. 6,418,558 to Roberts et al. of July 2002.

U.S. Patent No. 6,014,374 to Paneth et al. of January 2000.

U.S. Patent No. 6,134,220 to Le Strat et al. of October 2000.

U.S. Patent No. 5,199,031 to Dahlin et al. of March 1993.

U.S. Patent No. 6,385,460 to Wan of May 2002.

(9) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims:

103 Rejections

Claims 20-22, 25, 29 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Roberts et al.** (US Patent 6,418,558), in view of **Paneth et al.** (US Patent 6,014,374).

(9.1) **Roberts et al.** teaches hybrid fiber/coax video and telephony communication. Specifically, as per Claim 20, **Roberts et al.** teaches a method of transmission in a multi-frame system, each frame of the multi-frame system being associated with a first type of control information (CL24, L4-10: telephone information and ISU operations and **control data** modulated on carriers by the MCC modem is transmitted between the HDT and the telephony downstream transmitter; the telephony information and **control data** modulated on carriers by the ISUs is received at the telephony upstream receiver; CL30, L13-16: ISUs terminate and receive **control data** from the HDT and process the **control data** received therefrom; included in this processing are message to coordinate **dynamic channel allocation** in the communication system; CL32, L44-51: A 21-frame message requires 19 frames times to

decode the message and has two frames of latency while its two check symbols are decoded; CL35, L11-15: the CXMC also implements an ISU operations channel transceiver for multi-point to point operation between the HDT and all ISUs serviced in the 6MHZ bandwidth in which the CXMU **controls** transport of data within; CL35, L59-64: the ISU operations channel (IOC) transceiver of the CXMC contains transmit buffers to hold messages or **control data** from the controller and logic and loads this **control messages** ... to be provided to the MCC modem; CL37, L1-2: the multi-carrier modulation technique involves **encoding the telephony and control data**; CL37, L29-34: the multiframe signal is used by the MCC modem to convey downstream symbol timing to the ISUs; the multiframe clock conveys ... and **indicates the multi-carrier frame structure** so that the **telephony data may be correctly reassembled** at the ISU; CL37, L37-62: all ISUs will use the synchronization information inserted by the associated MCC modem to recover all downstream timing required by the ISUs; this synchronization allows the ISUs to **demodulate the downstream information and modulate the upstream information** in such a way that all ISU transmissions received at the HDT are synchronized to the same reference; ... the IOC channel and the synchronization channels may use a different modulation scheme for **transport of control data between the MCC modem and the ISUs**; CL39, L32-40: the MCC modem coordinates **the telephony information transport as well as control data transport** for controlling the ISUs by the HDT; the **control data** may include **dynamic allocation and assignment** messages, ISU synchronization control messages, ISU modem control messages, channel unit provisioning and any other ISU operation and provisioning information; CL41, L24-34: the spectrum assignment for one 6MHZ band for upstream and downstream transport of telephony information and **control data**

... has 240 payload channels, 24 IOC channels and 2 synchronization channels and 10 guard channels for a total of 276 channels for 552 carriers or tones; CL41, L55-66: the telephony payload channels and the IOC channels of the 6MHZ band are **interspersed** in the telephony payload channels with the IOC channel located every 10 payload channels; with such a distributed technique, wherein sub-bands of payload channels greater than 10 include an IOC channel, the amount of bandwidth an ISU sees can be limited such that an IOC channel is available for the HDT to communicate with the ISU; Fig 13: shows the IOC **control data channels**, the payload data channels and the synchronization channels in a 6MHZ frame);

there further being provided a second type of control information (CL30, L28-41: Each DS1U in the HDT takes four DS1s from the network and formats this information into four 24 channel, 2.56 Mbps data streams of modified DS0 signals referred to as CTSU inputs; each DS0 in the CTSU input has been modified by appending **a ninth bit** which can carry **multiframe timing, signaling information and control/status messages** (Fig. 9); the ninth bit signal (NSB) carries a pattern which is **updated each frame and repeats every 24 frames**; CL30, L42-49: the ninth bit signaling is a mechanism developed to carry the **multiframe timing**, out-of-band signaling bits and miscellaneous status and control information associated with each DS0 between DS1U and the channel units; its main function is to carry the signaling bits to channel units; CL98, L55-61: the rate adaptation (RA) unit is responsible for converting the 2.56 Mbps, 9 bit data format of the input to the 2.048Mbps, 8 bit data format in both the receive and transmit directions; in both directions the RA is responsible for managing any information that may be placed in the 9th bit; CL98, L62 to CL99, L1: the NBS is responsible for transmitting and receiving the data that is carried with each DS0 in the ninth bit; in **the**

upstream direction, the ninth bit carries information regarding the ordering of data within a multi-channel call; the signaling consists of a repeating number that indicates which time position the DS0 occupies in the multi-channel; Table 9 and CL99, L31-39: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the ordering information of the channels is shown as bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is **extracted and assembled** to get the byte value of the ordering information of the DS0 channel; this ordering information is used by the TSA to order the channels; CL99, L40-45: in **the downstream direction**, the NBS is used to enable data transmission; the processor will enable transmission by **sending a data pattern over the downstream ninth bit** of the first DS0 of a multi-channel call; Table 10 and CL10, L12-21: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the command information is sent in bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is **extracted and assembled** to get the commands; the idle sync command has a bit pattern of 0000 0000 0000 0000 and is used during idle time to synchronize the receivers; the data dial tone command has a bit pattern of 1000 0000 0000 0000 and is used to instruct the CDMs to enable transmission);

the method comprising:

a. partitioning the second type of control information into a number of sections; and b. forming a plurality of consecutive data frames for transmission, the number of consecutive data frames corresponding to the number of sections into which the code word is

partitioned (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9; as shown in CL30, L35-36 and Tables 9 and 10 of CL99, the control data are partitioned into 24 bits and each bit is sent in one frame; the bits are sent as the ninth bit, the bit pattern is updated each frame and repeated every 24 frame); and

c. transmitting with each frame of the multi-frame:

i. the first type of control information for the respective frame (CL35, L59-64; CL37, L37-62; Fig 13; CL39, L32-40; CL41, L55-66); and

ii. a section of the partitioned second type of control information (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9).

Roberts et al. does not expressly teach control information comprising a code word. **Paneth et al.** teaches control information comprising a code word (CL16, L38-42: code words are used to exchange the current state of the connection, link quality and power and timing adjustment; to exchange control and status information). Thus **Paneth et al.** provides **a definition of code word as control and status information** exchanged between the subscriber and the base station. It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to interpret the method of **Roberts et al.** using the definition of **Paneth et al.** for code word, because code words (control and status information) would be used to determine synchronization between the mobile station and the base station and to **exchange control and status information** (CL16, L38-40).

(9.2) As per Claim 21, **Roberts et al.** and **Paneth et al.** teach the method of Claim 20. **Roberts et al.** also teaches that the second type of control information is for use on receipt of the multi-frame (CL30, L28-41: each DS0 in the CTSU input has been modified by appending **a ninth bit** which can carry **multiframe timing, signaling information and control/status messages** (Fig. 9); the ninth bit signal (NSB) carries a pattern which is **updated each frame and repeats every 24 frames**; CL30, L42-49: the ninth bit signaling is a mechanism developed to carry the **multiframe timing**, out-of-band signaling bits and miscellaneous status and control information associated with each DS0 between DS1U and the channel units; its main function is to carry the signaling bits to channel units; CL98, L55-61: the rate adaptation (RA) unit is responsible for converting the 2.56 Mbps, 9 bit data format of the input to the 2.048Mbps, 8 bit data format in both the receive and transmit directions; in both directions the RA is responsible for managing any information that may be placed in the 9th bit; CL98, L62 to CL99, L1: the NBS is responsible for transmitting and receiving the data that is carried with each DS0 in the ninth bit; in **the upstream direction**, the ninth bit carries information regarding the ordering of data within a multi-channel call; the signaling consists of a repeating number that indicates which time position the DS0 occupies in the multi-channel; Table 9 and CL99, L31-39: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the ordering information of the channels is shown as bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is **extracted and assembled** to get the byte value of the ordering information of the DS0 channel; This ordering information is **used** by the TSA to order the channels; CL99, L40-45: in **the downstream direction**, the NBS is **used** to enable

data transmission; the processor will enable transmission by sending a data pattern over the downstream ninth bit of the first DS0 of a multi-channel call; Table 10 and CL10, L12-21: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the command information is sent in bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is **extracted and assembled** to get the commands; the idle sync command has a bit pattern of 0000 0000 0000 0000 and is **used** during idle time to synchronize the receivers; the data dial tone command has a bit pattern of 1000 0000 0000 0000 and is **used** to instruct the CDMs to enable transmission).

(9.3) As per Claim 22, **Roberts et al.** and **Paneth et al.** teach the method of Claim 20. **Roberts et al.** also teaches on receipt of the multi-frames reforming the second type of control information. Applicants' attention is directed to Paragraph 9.2 above which describes how the ninth bit transmitted through DS0 channels are extracted and reassembled (reformed) by the rate adaptation unit (RA) and used in the upstream and downstream directions.

(9.4) As per Claim 25, **Roberts et al.** and **Paneth et al.** teach the method of Claim 20. **Roberts et al.** also teaches that the step of transmitting further comprises transmitting data with each frame (CL24, L4-10: **telephone information** and ISU operations and control data modulated on carriers by the MCC modem is transmitted between the HDT and the telephony downstream transmitter; the **telephony information** and control data modulated on carriers by the ISUs is received at the telephony upstream receiver; CL35, L59-64: the ISU operations

channel (IOC) transceiver of the CXMC contains transmit buffers to hold **messages** or control data from the controller and logic and loads this control messages … to be provided to the MCC modem; CL37, L1-2: the multi-carrier modulation technique involves **encoding the telephony** and control data; CL37, L29-34: the multiframe signal is used by the MCC modem to convey downstream symbol timing to the ISUs; the multiframe clock conveys … and **indicates the multi-carrier frame structure** so that the **telephony data may be correctly reassembled** at the ISU; CL39, L32-40: the MCC modem coordinates the **telephony information transport** as well as control data transport for controlling the ISUs by the HDT; CL41, L24-34: the spectrum assignment for one 6MHZ band for upstream and downstream transport of **telephony information** and control data … has 240 payload channels, 24 IOC channels and 2 synchronization channels and 10 guard channels for a total of 276 channels for 552 carriers or tones; CL41, L55-66: the **telephony payload channels** and the IOC channels of the 6MHZ band are **interspersed** in the telephony payload channels with the IOC channel located every 10 payload channels; Fig 13: shows the IOC control data channels, the payload data channels and the synchronization channels in a 6MHZ frame);

(9.5) As per Claim 29, **Roberts et al.** teaches a method of transmission in a multi-frame system, each frame of the multi-frame system being associated with a first type of control information (CL32, L44-51; CL35, L11-15; CL35, L59-64; CL37, L29-34; CL37, L37-62; Fig 13; see paragraph 9.1 for detailed description); there further being provided a second type of control information (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9; see paragraph 9.1 for detailed description); wherein each frame of a plurality of consecutive frames

in the multi-frame sequence is transmitted with the first type of control information for the respective frame (CL35, L59-64; CL37, L37-62; Fig 13; CL39, L32-40; CL41, L55-66); and a section of the partitioned second type of control information the number of frames of the plurality of consecutive frames in the multi-frame sequence corresponding to the number of sections into which the control information is partitioned, (CL30, L28-36; CL30, L42-49; CL98, L634 to CL100, L21; Fig 9); the method comprising:

receiving frames of the multi-frame and reforming (reassembling) the sections of the second type of control information into the second type of control information (CL98, L62 to CL100, L21; see Paragraph 9.2 for detailed description).

Roberts et al. does not expressly teach control information comprising a code word; and reforming the control information into the code word. **Paneth et al.** provides a definition of code word as control information. As explained in Paragraph 9.2 above, the control information is reformed by **Roberts et al.** and this control information is the code word as per **Paneth et al.** (CL16, L38-42).

(9.6) As per Claim 32, **Roberts et al.** teaches a communication device (Fig. 1 and Fig. 3) for a multi-frame transmission communication system, each frame of the communication system being associated with a first type of control information (CL32, L44-51; CL35, L11-15; CL35, L59-64; CL37, L29-34; CL37, L37-62; Fig 13; see paragraph 9.1 for detailed description); there further being provided a second type of control information (CL30, L28-41; CL30, L42-

49; CL98, L62 to CL100, L21; Fig 9; see paragraph 9.1 for detailed description); the communication device comprising:

a. partitioning means adapted to partition the second type of control information into a number of sections corresponding to a number of a plurality of consecutive of frames in the multi-frame (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9; see paragraph 9.1 for detailed description); and

b. transmitter means (Fig. 3, telephony transmitter) adapted to transmit with each of the plurality of frames of the multi-frame:

i. the first type of control information for the respective frame (CL35, L59-64; CL37, L37-62; Fig 13; CL39, L32-40; CL41, L55-66; see paragraph 9.1 for detailed description); and

ii. a section of the second type of control information (CL30, L28-41; CL30, L42-49; CL98, L24 to CL100, L21; Fig 9; as shown in CL30, L35-36 and Tables 9 and 10 of CL99, the control bits are partitioned into 24 bits and each bit is sent in one frame; the bits are sent as the ninth bit, the bit pattern is updated each frame and repeated every 24 frame; see paragraph 9.1 for detailed description).

Roberts et al. does not expressly teach control information is a code word. **Paneth et al.** defines the control information as a code word (CL16, L38-42).

(9.7) As per Claim 33, **Roberts et al.** teaches a communication device (Fig. 1 and Fig. 3) for a multi-frame transmission communication system, each frame of the communication system

being associated with a first type of control information (CL32, L44-51; CL35, L11-15; CL35, L59-64; CL37, L29-34; CL37, L37-62; Fig 13; see paragraph 9.1 for detailed description); there further being provided a second type of control information (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9; see paragraph 9.1 for detailed description); wherein each frame of a plurality of consecutive frames in the multi-frame transmission communication system is transmitted with the first type of control information for the respective frame (CL35, L59-64; CL37, L37-62; Fig 13; CL39, L32-40; CL41, L55-66; see paragraph 9.1 for detailed description); and a section of the partitioned second type of control information (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9; see paragraph 9.1 for detailed description); the communication device comprising:

receiving means (Fig. 3, telephony receiver) for receiving frames of the multi-frame and reforming means for reforming the sections of the second type of control information into the second type of control information (CL98, L62 to CL100, L21).

Roberts et al. does not expressly teach control information comprising a code word; and reforming the control information into the code word. **Paneth et al.** provides a definition of code word as control information. As explained in Paragraph 9.2 above, the control information is reformed by **Roberts et al.** and this control information is the code word as per **Paneth et al.** (CL16, L38-42).

(9.8) As per Claim 34, **Roberts et al.** teaches a multi-frame transmission communication system, each frame or the communication system being associated with a first type of control

information (CL32, L44-51; CL35, L11-15; CL35, L59-64; CL37, L29-34; CL37, L37-62; Fig 13; see paragraph 9.1 for detailed description); there further being provided a second type of control information (CL30, L28-36; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9; see paragraph 9.1 for detailed description); the communication system comprising:

a. a first device having a partitioning means adapted to partition the second type of control information into a number of sections (CL98, L62 to CL99, L1: the NBS is responsible for transmitting and receiving the data that is carried with each DS0 in the ninth bit; in **the upstream direction**, the ninth bit carries information regarding the ordering of data within a multi-channel call; the signaling consists of a repeating number that indicates which time position the DS0 occupies in the multi-channel; Table 9 and CL99, L31-39: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the ordering information of the channels is shown as bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; CL99, L40-45: in **the downstream direction**, the NBS is **used** to enable data transmission; the processor will enable transmission by sending a data pattern over the downstream ninth bit of the first DS0 of a multi-channel call; Table 10 and CL10, L12-21: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the command information is sent in bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe); and

transmitter means adapted to transmit with each frame of the sequence of consecutive frames in the multi-frame, the first type of control information for the respective frame (CL35, L59-64; CL37, L37-62; Fig 13; CL39, L32-40; CL41, L55-66; see paragraph 9.1 for detailed

description); and a section of the second type of control information wherein each section is placed in a separate frame in a sequence of consecutive frames, the number of sections corresponding to the number of frames in the sequence of frames (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9; see paragraph 9.1 for detailed description); and

a second device having a receiver means (Fig. 3, telephony receiver) adapted to receive frames of a multi-frame transmission from the first device, and means for reforming the partitioned second type of control information. Applicants' attention is directed to Paragraph 9.2 above which describes how the ninth bit transmitted through DS0 channels are extracted and reassembled (reformed) by the rate adaptation unit (RA) and used in the upstream and downstream directions.

Roberts et al. does not expressly teach control information comprising a code word; and reforming the control information into the code word. **Paneth et al.** provides a definition of code word as control information. As explained in Paragraph 9.2 above, the control information is reformed by **Roberts et al.** and this control information is the code word as per **Paneth et al.** (CL16, L38-42).

Claims 23, 24, 31, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Roberts et al.** (US Patent 6,418,558) in view of **Paneth et al.** (US Patent 6,014,374), and further in view of **Le Strat et al.** (US Patent 6,134,220).

(9.9) As per Claim 23, **Roberts et al.** and **Paneth et al.** teach the method of Claim 20. **Roberts et al.** teaches the transmission is in a downlink (downstream) of a communication

system, the first type of control information representing synchronization information and various parameters such as path delay adjustment, initialization, activation, dynamic allocation messages, modem control messages etc. applied to the downlink (CL35, L59-64; CL37, L37-62; Fig 13; CL39, L32-40; CL41, L55-66; see paragraph 9.1 for detailed description); and the second type of control information representing multi-frame timing, out-of-band signaling and status and control messages associated with DS0 between Host digital terminal and the Integrated service unit (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9; see paragraph 9.1 for detailed description).

Roberts et al. and **Paneth et al.** do not expressly teach that the transmission is in a downlink of a communication system, the first type of control information represents a coding mode applied to the downlink and the second type of control information represents a coding mode to be applied in an uplink of the communication system.

Le Strat et al. teaches that the transmission is in a downlink of a communication system and the first type of control information represents a coding mode applied to the downlink (CL7, L6-8: the decision to change coding mode and/or transmission mode is taken in the base transceiver station; CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprises means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected. Since the coding mode is changed by the base transceiver station, it could be changed at any time without prior knowledge of the mobile station. CL1, L20-22: the TDMA technique divides time into frames of fixed and predetermined duration, the frames being in turn divided into time slots; each call is associated

with one or more time slots. Therefore, when the mobile station receives a frame, it has no knowledge of if the code mode used is same as the previous one or it is some thing new. Therefore, the base transceiver station has to transmit to the mobile station in the downlink direction, the coding mode used with each frame).

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Le Strat et al.** so that the transmission would be in a downlink of a communication system, the first type of control information would represent a coding mode applied to the downlink because the base transceiver station would have to transmit to the mobile station in the downlink direction, the coding mode used with each frame as described in the paragraph above and **Roberts et al.** would come very handy for that. (**Roberts et al.** teaches at CL35, L59-64: the ISU operations channel (IOC) transceiver of the CXMC contains transmit buffers to hold messages or **control data** and logic and loads this **control messages** … to be provided to the MCC modem; CL37, L1-2: the multi-carrier modulation technique involves **encoding the telephony and control data**; CL37, L29-34: the multiframe clock conveys … and **indicates the multi-carrier frame structure** so that the **telephony data may be correctly reassembled** at the ISU; CL37, L37-62: all ISUs will use the synchronization information inserted by the associated MCC modem to recover all downstream timing required by the ISUs; this synchronization allows the ISUs to **demodulate the downstream information and modulate the upstream information** in such a way that all ISU transmissions received at the HDT are synchronized to the same reference; CL39, L32-40: the MCC modem coordinates **the telephony information transport as well as control data transport** for controlling the ISUs

by the HDT; the control data may include **dynamic allocation and assignment messages**, ISU synchronization control messages, ISU modem control messages; CL41, L24-34: the spectrum assignment for one 6MHZ band for upstream and downstream transport of telephony information and control data … has 240 payload channels, 24 IOC channels and 2 synchronization channels; CL41, L55-66: the telephony payload channels and the IOC channels of the 6MHZ band are **interspersed** in the telephony payload channels with the IOC channel located every 10 payload channels; with such a distributed technique, wherein sub-bands of payload channels greater than 10 include an IOC channel, the amount of bandwidth an ISU sees can be limited such that an IOC channel is available for the HDT to communicate with the ISU; Fig 13: shows the **IOC control data channels**, the payload data channels and the synchronization channels in a 6MHZ frame).

Le Strat et al. does not teach that the transmission is in a downlink of a communication system and the second type of control information represents a coding mode to be applied in an uplink of the communication system. However, **Le Strat et al.** teaches at CL7, L6-8 that the decision to change coding mode and/or transmission mode is taken in the base transceiver station; CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprises means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected; the base transceiver station selects the coding mode for the uplink from mobile station to the base transceiver station and communicates that to the mobile station;CL7, L43 and L49-50: a mobile station including means for receiving an indication representative of the coding/transmission mode selected. CL1, L20-22: the TDMA technique

divides time into frames of fixed and predetermined duration, the frames being in turn divided into time slots; each call is associated with one or more time slots; CL10, L63-64: a quality indicator is determined regularly. This implies that the quality determination will be made at **regular time intervals**. Since time is divided into frames in the TDMA system, then quality measurement can also be made at intervals of specified frame times, for example for each n frames. If the quality measurement is made once every n frames, then the coding mode can be changed by the base transceiver station also only once every n frames. CL5, L20-22: a change of transmission mode to a transmission mode corresponding to a lesser amount of transmission resources; CL7, L16-18: selection of a coding mode is carried out such a manner as to limit the quantity of resources allocated in each transmission direction. This implies that it is necessary to minimize resources required to transmit from the base transceiver station to the mobile station the coding mode selected for the uplink.

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Le Strat et al.** so that the transmission would be in a downlink of a communication system and the second type of control information would represent a coding mode to be applied in an uplink of the communication system because it would be necessary to minimize resources required to transmit from the base transceiver station to the mobile station the coding mode selected for the uplink as described in the paragraph above and **Roberts et al.** would achieve that objective using one additional control bit (ninth bit) in the slot used for transmission of data. (**Roberts et al.** teaches at CL30, L28-41: each DS0 in the CTSU input has been modified by appending **a ninth bit** which can carry **multiframe timing, signaling information and**

control/status messages (Fig. 9); the ninth bit signal (NSB) carries a pattern which is **updated each frame and repeats every 24 frames**; CL30, L42-49: the ninth bit signaling is a mechanism developed to carry the **multiframe timing**, out-of-band signaling bits and miscellaneous status and control information associated with each DS0 between DS1U and the channel units; CL98, L55-61: the rate adaptation (RA) unit is responsible for converting the 2.56 Mbps, 9 bit data format of the input to the 2.048Mbps, 8 bit data format in both the receive and transmit directions; in both directions the RA is responsible for managing any information that may be placed in the 9th bit; CL98, L62 to CL99, L1: the NBS is responsible for transmitting and receiving the data that is carried with each DS0 in the ninth bit; CL99, L40-45: in **the downstream direction**, the NBS is used to enable data transmission; the processor will enable transmission by sending a data pattern over the downstream ninth bit of the first DS0 of a multi-channel call; Table 10 and CL10, L12-21: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the command information is sent in bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is extracted and assembled to get the commands; the idle sync command has a bit pattern of 0000 0000 0000 0000 and is used during idle time to synchronize the receivers; the data dial tone command has a bit pattern of 1000 0000 0000 0000 and is used to instruct the CDMs to enable transmission).

(9.10) As per Claim 24, **Roberts et al.** and **Paneth et al.** teach the method of Claim 20. **Roberts et al.** teaches the transmission is in a downlink (downstream) of a communication system, the first type of control information representing synchronization information and

various parameters such as path delay adjustment, initialization, activation, dynamic allocation messages, modem control messages etc applied to the downlink (CL35, L59-64; CL37, L37-62; Fig 13; CL39, L32-40; CL41, L55-66); and the second type of control information representing multi-frame timing, out-of-band signaling and status and control messages associated with DS0 between Host digital terminal and the Integrated service unit (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9).

Roberts et al. and **Paneth et al.** do not expressly teach that the transmission is in an uplink of a communication system and the first type of control information represents a coding mode applied in the uplink. **Le Strat et al.** teaches that the transmission is in an uplink of a communication system and the first type of control information represents a coding mode applied in the uplink (CL7, L6-8: the decision to change coding mode and/or transmission mode is taken in the base transceiver station; CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprise means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected; the base transceiver station selects the coding mode for the uplink from mobile station to the base transceiver station and communicates that to the mobile station. CL7, L43 and L49-50: a mobile station including means for receiving an indication representative of the coding/transmission mode selected. The actual coding mode for the uplink could be changed by the mobile station, at any time without prior knowledge of the base transceiver station. CL1, L20-22: the TDMA technique divides time into frames of fixed and predetermined duration, the frames being in turn divided into time slots; each call is associated with one or more time slots. Therefore,

when the base transceiver station receives a frame, it has no knowledge of if the code mode used is same as the previous one or it is some thing new. Therefore, the mobile station has to transmit to the base transceiver station in the uplink direction, the coding mode used with each frame).

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Le Strat et al.** so that the transmission would be in an uplink of a communication system and the first type of control information would represent a coding mode applied in the uplink because the mobile station would have to transmit to the base transceiver station in the uplink direction, the coding mode used with each frame as described in the paragraph above and **Roberts et al.** would come very handy for that. (**Roberts et al.** teaches at CL35, L59-64: the ISU operations channel (IOC) transceiver of the CXMC contains transmit buffers to hold messages or **control data** and logic and loads this **control messages** ... to be provided to the MCC modem; CL37, L1-2: the multi-carrier modulation technique involves **encoding the telephony and control data**; CL37, L29-34: the multiframe clock conveys ... and **indicates the multi-carrier frame structure** so that the **telephony data may be correctly reassembled** at the ISU; CL37, L37-62: all ISUs will use the synchronization information inserted by the associated MCC modem to recover all downstream timing required by the ISUs; this synchronization allows the ISUs to **demodulate the downstream information and modulate the upstream information** in such a way that all ISU transmissions received at the HDT are synchronized to the same reference; CL39, L32-40: the MCC modem coordinates **the telephony information transport as well as control data transport** for controlling the ISUs

by the HDT; the control data may include **dynamic allocation and assignment messages**, ISU synchronization control messages, ISU modem control messages; CL41, L24-34: the spectrum assignment for one 6MHZ band for upstream and downstream transport of telephony information and control data ... has 240 payload channels, 24 IOC channels and 2 synchronization channels; CL41, L55-66: the telephony payload channels and the IOC channels of the 6MHZ band are **interspersed** in the telephony payload channels with the IOC channel located every 10 payload channels; with such a distributed technique, wherein sub-bands of payload channels greater than 10 include an IOC channel, the amount of bandwidth an ISU sees can be limited such that an IOC channel is available for the HDT to communicate with the ISU; Fig 13: shows the **IOC control data channels**, the payload data channels and the synchronization channels in a 6MHZ frame).

Le Strat et al. does not teach that the transmission is in an uplink of a communication system, the second type of control information representing a downlink quality measured in the downlink. However, **Le Strat et al.** teaches at CL7, L6-11 that the decision to change coding mode and/or transmission mode is taken in the base transceiver station; the mobile station transmitting to the base transceiver station information representative of transmission quality in the base transceiver station to the mobile station direction; CL7, L43-48: a mobile station including means for determining at least one indication of transmission quality in the base transceiver station to the mobile station direction and means for transmitting the indication to the base transceiver station. Therefore the mobile station determines one indication of transmission quality in the base transceiver station to the mobile station direction and transmits the indication to the base transceiver station; CL1, L20-22: the TDMA technique divides time

into frames of fixed and predetermined duration, the frames being in turn divided into time slots; each call is associated with one or more time slots; CL10, L63-64: a quality indicator is determined regularly. This implies that the quality determination will be made at regular time intervals. Since time is divided into frames in the TDMA system, then quality measurement can also be made at intervals of specified frame times, for example for each n frames. CL5, L20-22: a change of transmission mode to a transmission mode corresponding to a lesser amount of transmission resources; CL7, L16-18: selection of a coding mode is carried out such a manner as to limit the quantity of resources allocated in each transmission direction. This implies that it is necessary to minimize resources required to transmit from the mobile station to the base transceiver station the indication of transmission quality.

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Le Strat et al.** so that the transmission would represent a downlink quality measured in the downlink because it would be necessary to minimize resources required to transmit from the mobile station to the base transceiver station the indication of transmission quality as described in the paragraph above and **Roberts et al.** would achieve that objective using one additional control bit (ninth bit) in the slot used for transmission of data. (**Roberts et al.** teaches at CL30, L28-41: each DS0 in the CTSU input has been modified by appending **a ninth bit** which can carry **multiframe timing, signaling information and control/status messages** (Fig. 9); the ninth bit signal (NSB) carries a pattern which is **updated each frame and repeats every 24 frames**; CL30, L42-49: the ninth bit signaling is a mechanism developed to carry the **multiframe timing**, out-of-band signaling bits and miscellaneous status and

control information associated with each DS0 between DS1U and the channel units; CL98, L55-61: the rate adaptation (RA) unit is responsible for converting the 2.56 Mbps, 9 bit data format of the input to the 2.048Mbps, 8 bit data format in both the receive and transmit directions; in both directions the RA is responsible for managing any information that may be placed in the 9th bit; CL98, L62 to CL99, L1: the NBS is responsible for transmitting and receiving the data that is carried with each DS0 in the ninth bit; in **the upstream direction**, the ninth bit carries information regarding the ordering of data within a multi-channel call; the signaling consists of a repeating number that indicates which time position the DS0 occupies in the multi-channel; Table 9 and CL99, L31-39: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the ordering information of the channels is shown as bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is extracted and assembled to get the byte value of the ordering information of the DS0 channel; This ordering information is used by the TSA to order the channels).

(9.11) As per Claim 31, **Roberts et al.** and **Paneth et al.** teach the method of Claim 29, which includes control information comprising a code word.

Roberts et al. teaches on receipt of the multi-frames reforming the second type of control information as described in Paragraph 9.2 above.

Roberts et al. also teaches encoding frames for transmission (CL36, L59 to CL37, L2: the MCC modem receives 256 DS0+ channels from the CXMC; the MCCC modem transmits this information to all the ISUs using multi-carrier modulation technique... the multi-carrier

modulation technique involves encoding the telephony and control data; CL37, L27-34: incoming downstream information from CXMC to the MCC modem is frame aligned; ... the multiframe clock conveys the channel correspondence and indicates the multi-carrier frame structure so that the telephony data may be correctly reassembled at the ISU).

Roberts et al. and **Paneth et al.** do not expressly teach encoding frames for transmission **depending on the reformed code word**. **Le Strat et al.** teaches encoding frames for transmission **depending on the received control information** (CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprise means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected; the base transceiver station selects the coding mode for the uplink from mobile station to the base transceiver station and communicates that to the mobile station. CL7, L43 and L49-50: a mobile station including means for receiving an indication representative of the coding/transmission mode selected; CL4, L60-61; a change of coding mode is necessary if the quality of channel deteriorates. As described in Paragraph 9.9 above, **Roberts et al., Paneth et al.** and **Le Strat et al.** teach that the transmission is in a downlink of a communication system and the second type of control information represents a coding mode to be applied in an uplink of the communication system because it would be necessary to minimize resources required to transmit from the base transceiver station to the mobile station the coding mode selected for the uplink As described in Paragraph 9.2 above, **Roberts et al.** teaches reforming the second type of control information).

(9.12) As per Claim 37, **Roberts et al.** and **Paneth et al.** teach the multi-frame transmission communication system of Claim 34. **Roberts et al.** teaches telephony signal transmission between the host digital terminal (HDT) and the home or multiple user integrated services unit (HISU or MISU) as shown in Figure 1. The HDT contains the DS1U, CXMU, the MCC modem and the telephony transmitter and receiver as shown in Figure 3. The HDT is the service provider and the ISUs are the service receiver. Figure 5 shows the optical distribution network between the HDT and the ISUs. The downstream is from HDT to ISU and the downstream video receiver and downstream telephony receivers handle the traffic from HDT to ISUs. The upstream is from ISUs to the HDT and the upstream telephony and set top control transmitters handle the traffic from the ISUs to the HDT. Therefore the downstream goes from the service provider to the service receiver and the upstream goes from the service receiver to the service provider.

Roberts et al. and **Paneth et al.** do not deal with mobile communication. Therefore, **Roberts et al.** and **Paneth et al.** do not expressly teach that the first device is a fixed part of the communication system and the second device is a mobile part of the communication system and there is an uplink established from the mobile part of the communication system to the fixed part of the communication system. **Le Strat et al.** teaches that the first device is a fixed part of the communication system (base transceiver station) and the second device is a mobile part of the communication system (mobile station) and there is an uplink established from the mobile part of the communication system to the fixed part of the communication system (CL3, L61-63: in this case the service provider is the base transceiver station and the service receiver is the mobile station). It would have been obvious to one of ordinary skill in the art at the time

of the Applicants' invention to correlate the telephone signal transmission system of **Roberts et al.** and **Paneth et al.** with the mobile communication system of **Le Strat et al.** that included the first device being a fixed part of the communication system and the second device being a mobile part of the communication system and an uplink being established from the mobile part of the communication system to the fixed part of the communication system. Then the HDT of the telephone signal transmission system would correspond to the base transceiver station of the mobile communication system; the ISUs would correspond to the mobile station; the downstream of the telephone signal transmission system would correspond to the down link of the mobile communication system and the upstream would correspond to the uplink.

(9.13) As per Claim 38, **Roberts et al.** and **Paneth et al.** teach the multi-frame transmission communication system of Claim 34. **Roberts et al.** teaches downstream from HDT to the ISUs and upstream from ISUs to the HDTas described in Paragraph 9.12 above.

Roberts et al. and **Paneth et al.** do not deal with mobile communication. Therefore, **Roberts et al.** and **Paneth et al.** do not expressly teach that the first device is a fixed part of the communication system and the second device is a mobile part of the communication system and there is downlink established from the fixed part of the communication system to the mobile part of the communication system. **Le Strat et al.** teaches that the first device is a fixed part of the communication system and the second device is a mobile part of the communication system and there is downlink established from the fixed part of the communication system to the mobile part of the communication system (CL3, L61-65: in this case the service provider is the base transceiver station and the service receiver is the mobile station). It would have been

obvious to one of ordinary skill in the art at the time of the Applicants' invention to correlate the telephone signal transmission system of **Roberts et al.** and **Paneth et al.** with the mobile communication system of **Le Strat et al.** that included the first device being a fixed part of the communication system and the second device being a mobile part of the communication system and a downlink being established from the fixed part of the communication system to the mobile part of the communication system. Then the HDT of the telephone signal transmission system would correspond to the base transceiver station of the mobile communication system; the ISUs would correspond to the mobile station; the downstream of the telephone signal transmission system would correspond to the down link and the upstream of the mobile communication system would correspond to the uplink.

Claims 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Roberts et al.** (US Patent 6,418,558) in view of **Paneth et al.** (US Patent 6,014,374), and further in view of **Dahlin** (US Patent 5,199,031).

(9.14) As per Claim 26, **Roberts et al.** and **Paneth et al.** teach the method of Claim 25. **Roberts et al.** teaches modifying the DS0 by appending a ninth bit to carry multi-frame timing, signaling information and control/status information (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9). **Roberts et al.** and **Paneth et al.** do not teach that the step of transmitting comprises channel encoding the data and the section of the second type of control information. **Dahlin** teaches that the step of transmitting comprises channel encoding the data and the section of the second type of control information (Fig. 2, Items 102 and 104; CL4, L14-

35). It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Dahlin** so that the step of transmitting comprised channel encoding the data and the section of the second type of control information because that would allow protecting important data bits in the speech code and providing a cyclic redundancy check (CL4, L31-35); and manipulating the incoming data to carry out error detection and correction (CL4, L25-29).

(9.15) As per Claim 27, **Roberts et al., Paneth et al.** and **Dahlin** teach the method of Claim 26. **Roberts et al.** teaches transmitting with each frame of the multi-frame the first type of control information for the respective frame (CL35, L59-64; CL37, L37-62; Fig 13; CL39, L32-40; CL41, L55-66). **Roberts et al.** and **Paneth et al.** do not teach channel coding the first type of control information. **Dahlin** teaches channel coding the first type of control information (Fig. 2, Items 102 and 104; CL4, L14-35).

(9.16) As per Claim 28, **Roberts et al., Paneth et al.** and **Dahlin** teach the method of Claim 27. **Roberts et al.** teaches frame formatting and interleaving the channel coded first type of control information, data and section of the second type of control information (CL30, L34-36: the modified DS0 is referred to as a DS0+; the ninth bit signal carries a pattern which is updated each frame and repeats every 24 frames; Fig 13; CL38, L33-34; CL41, L55-66: the telephony payload channels and IOC channels are **interspersed** in the telephony payload channels with an IOC channel located every payload channels).

Claims 30 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Roberts et al.** (US Patent 6,418,558) in view of **Paneth et al.** (US Patent 6,014,374), and further in view of **Wan** (US Patent 6,385,460).

(9.17) As per Claim 30, **Roberts et al.** and **Paneth et al.** teach the method of Claim 29. **Roberts et al.** and **Paneth et al.** do not expressly teach the step of decoding the received frames in accordance with a mode code derived from the first type of control information for each frame. **Wan** teaches the step of decoding the received frames in accordance with a mode code derived from the first type of control information for each frame (CL6, L21-23). It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Wan** that included the step of decoding the received frames in accordance with a mode code derived from the first type of control information for each frame because the mobile unit would be provided with the coding mode and key needed to decode and demodulate the information coming from the base station (CL6, L21-23).

(9.18) As per Claim 35, **Roberts et al.** and **Paneth et al.** teach the multi-frame transmission communication system of Claim 34. **Roberts et al.** and **Paneth et al.** do not expressly teach that the second device is adapted to decode the frames of the multi-frame transmission in dependence on the first type of control information contained in a received frame. **Wan** teaches that the second device is adapted to decode the frames of the multi-frame

transmission in dependence on the first type of control information contained in a received frame (CL6, L21-23

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Roberts et al.** (US Patent 6,418,558) in view of **Paneth et al.** (US Patent 6,014,374) and **Wan** (US Patent 6,385,460), and further in view of **Le Strat et al.** (US Patent 6,134,220).

(9.19) As per Claim 36, **Roberts et al., Paneth et al.** and **Wan** teach the multi-frame transmission communication system of Claim 35, including reformed code word.

Roberts et al. teaches on receipt of the multi-frames reforming the second type of control information as described in Paragraph 9.2 above.

Roberts et al. also teaches encoding frames for transmission and transmission means for transmitting the encoded data to the first device (CL36, L59 to CL37, L2: the MCC modem receives 256 DS0+ channels from the CXMC; the MCCC modem transmits this information to all the ISUs using multi-carrier modulation technique… the multi-carrier modulation technique involves encoding the telephony and control data; CL37, L27-34: incoming downstream information from CXMC to the MCC modem is frame aligned; … the multiframe clock conveys the channel correspondence and indicates the multi-carrier frame structure so that the telephony data may be correctly reassembled at the ISU).

Roberts et al., Paneth et al. and **Wan** do not expressly teach that the second device further comprises encoding means for encoding data for transmission **using a mode code based on the reformed control information**. **Le Strat et al.** teaches that the second device

further comprises encoding means for encoding data for transmission **using a mode code based on the received control information** (CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprise means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected; the base transceiver station selects the coding mode for the uplink from mobile station to the base transceiver station and communicates that to the mobile station. CL7, L43 and L49-50: a mobile station including means for receiving an indication representative of the coding/transmission mode selected; CL4, L60-61; a change of coding mode is necessary if the quality of channel deteriorates. As described in Paragraph 9.9 above, **Roberts et al., Paneth et al.** and **Le Strat et al.** teach that the transmission is in a downlink of a communication system and the second type of control information represents a coding mode to be applied in an uplink of the communication system because it would be necessary to minimize resources required to transmit from the base transceiver station to the mobile station the coding mode selected for the uplink As described in Paragraph 9.2 above, **Roberts et al.** teaches reforming the second type of control information).

(10) Response to the Arguments

Appellants' Arguments filed with respect to claims 20-38 in the Appeal Brief have been fully considered and they are not persuasive. Examiner submits to the Board that the rejections applied are proper and should be maintained.

(10.1) Response to Appellants' Arguments regarding claim rejections under 35 U.S.C. §103 (a)

(10.1.1) Roberts et al. and Paneth et al. do not disclose a method or apparatus in which control information of the second type is partitioned among consecutive frames and transmitted

Appellants' Arguments

Roberts et al. does not disclose or suggest a method or apparatus in which control information of the second type is partitioned among consecutive frames and transmitted, wherein the second type of control information is a code word that is reassembled and used upon receipt. The ninth frame signaling bit described in Roberts et al. is not a section of a code word. One skilled in the art would not substitute the code word in Paneth et al. for the information conveyed by the ninth frame signaling bit in Roberts et al. There is no suggestion in either reference to partition a code word into sections and transmit the code word one section at a time over consecutive frames.

Examiner's response

The Examiner disagrees with this argument.

Roberts et al. teaches a second type of control information. **Roberts et al.** teaches the following: CL30, L28-41: Each DS1U in the HDT takes four DS1s from the network and formats this information into four 24 channel, 2.56 Mbps data streams of modified DS0 signals

referred to as CTSU inputs; each DS0 in the CTSU input has been modified by appending **a ninth bit** which can carry **multiframe timing, signaling information and control/status messages** (Fig. 9); the ninth bit signal (NSB) carries a pattern which is **updated each frame and repeats every 24 frames**; CL30, L42-49: the ninth bit signaling is a mechanism developed to carry the **multiframe timing**, out-of-band signaling bits and miscellaneous status and **control information** associated with each DS0 between DS1U and the channel units; its main function is to carry the signaling bits to channel units; CL98, L55-61: the rate adaptation (RA) unit is responsible for converting the 2.56 Mbps, 9 bit data format of the input to the 2.048Mbps, 8 bit data format in both the receive and transmit directions; in both directions the RA is responsible for managing any information that may be placed in the 9th bit; CL98, L62 to CL99, L1: the NBS is responsible for transmitting and receiving the data that is carried with each DS0 in the ninth bit; in **the upstream direction**, the ninth bit carries information regarding the ordering of data within a multi-channel call; the signaling consists of a repeating number that indicates which time position the DS0 occupies in the multi-channel; Table 9 and CL99, L31-39: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the ordering information of the channels is shown as bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is extracted and assembled (reformed) to get the byte value of the ordering information of the DS0 channel; this ordering information is used by the TSA to order the channels; CL99, L40-45: in **the downstream direction**, the NBS is used to enable data transmission; the processor will enable transmission by sending a data pattern over the downstream ninth bit of the first DS0 of a multi-channel call; Table 10 and CL10, L12-21:

there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the command information is sent in bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is extracted and assembled (reformed) to get the commands; the idle sync command has a bit pattern of 0000 0000 0000 0000 and is used during idle time to synchronize the receivers; the data dial tone command has a bit pattern of 1000 0000 0000 0000 and is used to instruct the CDMs to enable transmission.

Roberts et al. teaches partitioning the second type of control information into a number of sections; and forming a plurality of consecutive data frames for transmission, the number of consecutive data frames corresponding to the number of sections into which the code word is partitioned (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9; as shown in CL30, L35-36 and Tables 9 and 10 of CL99, the control data are partitioned into 24 bits and each bit is sent in one frame; the bits are sent as the ninth bit, the bit pattern is updated each frame and repeated every 24 frame; and

transmitting with each frame of the multi-frame a section of the partitioned second type of control information (CL30, L28-41; CL30, L42-49; CL98, L62 to CL100, L21; Fig 9).

Roberts et al. does not expressly teach control information comprising a code word. **Paneth et al.** teaches control information comprising a code word (CL16, L38-42: code words are used to exchange the current state of the connection, link quality and power and timing adjustment; to exchange control and status information). Thus **Paneth et al.** provides a **definition of code word as control and status information exchanged between the**

subscriber and the base station. The Examiner takes the position that all the features of the second type of control information claimed by the appellants are taught by **Roberts et al.** Only the definition of the control information as code word is lacking in **Roberts et al.**

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to interpret the method of **Roberts et al.** using the definition of **Paneth et al.** for code word, because code words (control and status information) would be used to determine synchronization between the mobile station and the base station and to exchange control and status information (CL16, L38-40).

(10.1.2) The Examiner has failed to meet his burden for a prima facie case of obviousness for combining the two references

Appellants' Arguments

The Examiner has failed to meet his burden for a prima facie case of obviousness under 35 U.S.C. § 103. To establish a prima facie case of obviousness one must show some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art that would lead that individual to combine the relevant teachings of the references. Other than stating that Paneth et al. describes control information comprising a code word, the Examiner has not provided any support for combining the two references in support of this rejection.

Examiner's response

The Examiner disagrees with this argument.

As stated in Paragraph 10.1.1 above, the Examiner takes the position that all the features of the second type of control information claimed by the appellants are taught by **Roberts et al.** Only the **definition of the control information as code word** is lacking in **Roberts et al.**

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to interpret the method of **Roberts et al.** using the definition of **Paneth et al.** for code word, because code words (control and status information) would be used to determine synchronization between the mobile station and the base station and to exchange control and status information (CL16, L38-40).

(10.1.3) <u>The combined teachings of the two references do not teach using the partitioned code word when the multiple frames carrying the partitioned code word are received.</u>

<u>Appellants' Arguments</u>

The combined teachings of the two references do not teach using the partitioned code word when the multiple frames carrying the partitioned code word are received. Roberts et al. does not teach partitioning this information into sections of multiple, consecutive frames. Since neither Roberts et al. nor Paneth et al. disclose partitioning a code word among multiple consecutive frames, the combined teachings of these references do not disclose using the partitioned second type of control information on receipt of the multi-frame.

<u>Examiner's response</u>

The Examiner disagrees with this argument.

Roberts et al. teaches that the second type of control information is for use on receipt of the multi-frame. **Roberts et al.** states the following: CL30, L28-41: each DS0 in the CTSU input has been modified by appending **a ninth bit** which can carry **multiframe timing, signaling information and control/status messages** (Fig. 9); the ninth bit signal (NSB) carries a pattern which is **updated each frame and repeats every 24 frames**; CL30, L42-49: the ninth bit signaling is a mechanism developed to carry the **multiframe timing**, out-of-band signaling bits and miscellaneous status and control information associated with each DS0; its main function is to carry the signaling bits to channel units; CL98, L55-61: the rate adaptation (RA) unit is responsible for converting the 2.56 Mbps, 9 bit data format of the input to the 2.048Mbps, 8 bit data format in both the receive and transmit directions; in both directions the RA is responsible for managing any information that may be placed in the 9th bit; CL98, L62 to CL99, L1: the NBS is responsible for transmitting and receiving the data that is carried with each DS0 in the ninth bit; in **the upstream direction**, the ninth bit carries information regarding the ordering of data within a multi-channel call; the signaling consists of a repeating number that indicates which time position the DS0 occupies in the multi-channel; Table 9 and CL99, L31-39: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the ordering information of the channels is shown as bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is **extracted and reassembled** to get the byte value of the ordering information of the DS0 channel. This ordering information is **used** by the TSA to order the channels. CL99, L40-45: in **the downstream direction**, the NBS is **used** to enable

data transmission; the processor will enable transmission by sending a data pattern over the downstream ninth bit of the first DS0 of a multi-channel call; Table 10 and CL10, L12-21: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the command information is sent in bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is **extracted and assembled** to get the commands; the idle sync command has a bit pattern of 0000 0000 0000 0000 and is **used** during idle time to synchronize the receivers; the data dial tone command has a bit pattern of 1000 0000 0000 0000 and is **used** to instruct the CDMs to enable transmission.

Therefore, the Examiner takes the position that the combined teachings of the two references teach **using the partitioned code word** when the multiple frames carrying the partitioned code word are received.

(10.1.4) The combined teachings of these references clearly do not disclose or suggest reforming the partitioned second type of control information on receipt of the multi-frame

Appellants' Arguments

The combined teachings of the two references do not teach using the partitioned code word when the multiple frames carrying the partitioned code word are received. Roberts et al. does not teach partitioning this information into sections of multiple, consecutive frames. Since neither Roberts et al. nor Paneth et al. suggest partitioning a code word among multiple

frames, the combined teachings of these references do not disclose reforming the partitioned second type of control information on receipt of the multi-frame.

Examiner's response

The Examiner disagrees with this argument.

Roberts et al. teaches on receipt of the multi-frames reforming the second type of control information. Applicants' attention is directed to Paragraph 10.1.3 above which describes how the ninth bit transmitted through DS0 channels are extracted and reassembled (reformed) by the rate adaptation unit (RA) and used in the upstream and downstream directions.

Therefore, the Examiner takes the position that the combined teachings of the two references teach reforming the partitioned second type of control information on receipt of the multi-frame.

(10.1.5) The references do not disclose or suggest partitioning a second type of control information into multiple sections and transmitting each section with a different frame in a multi-frame

Appellants' Arguments

The references, either alone or in combination do not disclose or suggest partitioning a second type of control information into multiple sections and transmitting each section with a different frame in a multi-frame. Roberts et al. does not describe partitioning information into

sections and transmitting each section in a different frame. Although Paneth does describe code words, Paneth does not describe partitioning code words into sections and transmitting those sections with different frames.

Examiner's response

The Examiner disagrees with this argument.

The references disclose partitioning a second type of control information into multiple sections and transmitting each section with a different frame in a multi-frame. Appellants' attention is directed to Paragraph 10.1.1 above.

(10.1.6) Roberts et al. contemplates partitioning the bits into the gaps within a single frame.

Appellants' Arguments

The Examiner characterizes the ninth bit described in Roberts et al. as a second type of control information. The Examiner states that the control information is partitioned into 24 bits and each bit is sent in one frame. From these remarks, it is clear that the Examiner has misconstrued Roberts et al. Referring to FIGS. 9 and 10, it is clear that Roberts et al. contemplates partitioning the bits into the gaps within a single frame. The description of FIG. 9 reinforces this interpretation, "FIGS. 9, 10, 11 show data frame structures and frame signaling utilized in the HDT of FIG. 3." Referring to FIG. 9 of Roberts et al., the entire illustrated structure is identified as "320 BIT PERIODS PER 125 uSEC FRAME." Therefore, Roberts et

al. clearly does not disclose partitioning a second type of control information into sections and transmitting those sections in different ones of a plurality of frames as required by claim 32.

Examiner's response

The Examiner disagrees with this argument.

Appellants' attention is directed to Paragraph 10.1.1 which describes how **Roberts et al.** discloses partitioning a second type of control information into sections and transmitting those sections in different ones of a plurality of frames as required by claim 32.

(10.1.7) Paneth does not describe partitioning the code words described in that reference.

Appellants' Arguments

Paneth does not describe partitioning the code words described in that reference. The Applicants maintain that Roberts et al. is not properly combined with Paneth to teach partitioning a second type of control information comprising a code word among multiple frames.

Examiner's response

As stated in Paragraph 10.1.1 above, **Roberts et al.** describes partitioning the control information described in that reference. Only the **definition of the control information as code word** is lacking in **Roberts et al.** Since all the features of the second type of control information is taught by **Roberts et al.** and only the **definition of the control information as**

code word is provided by **Paneth et al.,** the Examiner takes the position that **Roberts et al.** is properly combined with **Paneth et al.** to teach partitioning a second type of control information comprising a code word among multiple frames.

(10.1.8) Paneth does not contemplate reforming the code word upon receiving it.

Appellants' Arguments

Roberts et al. does not teach control information comprising a code word. The Examiner states that Paneth teaches control information comprising a code. The Examiner states that Paneth describes reforming the control information. Paneth does not disclose partitioning the code word in the first instance. Paneth clearly does not contemplate reforming the code word upon receiving it.

Examiner's response

The Examiner agrees that Paneth does not disclose partitioning the code word in the first instance; and Paneth clearly does not contemplate reforming the code word upon receiving it. As described in Paragraph 10.1.3, **Roberts et al.** teaches reforming the control information upon receiving it. Paneth teaches the definition of control information as a code word as explained in Paragraph 10.1.1.

(10.1.9) <u>The Examiner does not explain what, in the references, would teach one skilled in the art to substitute the coding modes in Le Strat et al. for the first and second type of control information described in Roberts et al.</u>

<u>Appellants' Arguments</u>

The Examiner cites Le Strat et al. merely because that reference describes transmitting first and second coding modes to be applied in the downlink and the uplink, respectively. The Examiner does not explain what, in the references themselves, would teach one skilled in the art to substitute the coding modes in Le Strat et al. for the first and second type of control information described in Roberts et al. Examiner has failed to make a prima facie case of obviousness based on the cited combination of references. Le Strat et al. clearly does not disclose or suggest partitioning the second type of control information in the claimed manner and transmitting that information as recited in claim 23.

<u>Examiner's response</u>

The Examiner has explained in Paragraph 9.9 above and explains as follows below what, in the references themselves, would teach one skilled in the art to substitute the coding modes in Le Strat et al. for the first and second type of control information described in Roberts et al.

Roberts et al. and **Paneth et al.** do not expressly teach that when the transmission is in a downlink of a communication system, the first type of control information represents a

coding mode applied to the downlink and the second type of control information represents a coding mode to be applied in an uplink of the communication system.

Le Strat et al. teaches that the transmission is in a downlink of a communication system and the first type of control information represents a coding mode applied to the downlink (CL7, L6-8: the decision to change coding mode and/or transmission mode is taken in the base transceiver station; CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprises means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected. Since the coding mode is changed by the base transceiver station, it could be changed at any time without prior knowledge of the mobile station. CL1, L20-22: the TDMA technique divides time into frames of fixed and predetermined duration, the frames being in turn divided into time slots; each call is associated with one or more time slots. Therefore, when the mobile station receives a frame, it has no knowledge of if the code mode used is same as the previous one or it is some thing new. Therefore, the base transceiver station has to transmit to the mobile station in the downlink direction, the coding mode used with each frame).

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Le Strat et al.** so that the transmission would be in a downlink of a communication system and the first type of control information would represent a coding mode applied to the downlink because the base transceiver station would have to transmit to the mobile station in the downlink direction, the coding mode used with each frame as described in the paragraph

above and **Roberts et al.** would come very handy for that. (**Roberts et al.** teaches at CL35, L59-64: the ISU operations channel (IOC) transceiver of the CXMC contains transmit buffers to hold messages or **control data** and logic and loads this **control messages** ... to be provided to the MCC modem; CL37, L1-2: the multi-carrier modulation technique involves **encoding the telephony and control data**; CL37, L29-34: the multiframe clock conveys ... and **indicates the multi-carrier frame structure** so that the **telephony data may be correctly reassembled** at the ISU; CL37, L37-62: all ISUs will use the synchronization information inserted by the associated MCC modem to recover all downstream timing required by the ISUs; this synchronization allows the ISUs to **demodulate the downstream information and modulate the upstream information** in such a way that all ISU transmissions received at the HDT are synchronized to the same reference; CL39, L32-40: the MCC modem coordinates **the telephony information transport as well as control data transport** for controlling the ISUs by the HDT; the control data may include **dynamic allocation and assignment messages**, ISU synchronization control messages, ISU modem control messages; CL41, L24-34: the spectrum assignment for one 6MHZ band for upstream and downstream transport of telephony information and control data ... has 240 payload channels, 24 IOC channels and 2 synchronization channels; CL41, L55-66: the telephony payload channels and the IOC channels of the 6MHZ band are **interspersed** in the telephony payload channels with the IOC channel located every 10 payload channels; with such a distributed technique, wherein sub-bands of payload channels greater than 10 include an IOC channel, the amount of bandwidth an ISU sees can be limited such that an IOC channel is available for the HDT to communicate with the ISU;

Fig 13: shows the **IOC control data channels**, the payload data channels and the synchronization channels in a 6MHZ frame).

Le Strat et al. does not teach that the transmission is in a downlink of a communication system, the second type of control information representing a coding mode to be applied in an uplink of the communication system. However, **Le Strat et al.** teaches at CL7, L6-8 that the decision to change coding mode and/or transmission mode is taken in the base transceiver station; CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprises means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected; the base transceiver station selects the coding mode for the uplink from mobile station to the base transceiver station and communicates that to the mobile station; CL7, L43 and L49-50: a mobile station including means for receiving an indication representative of the coding/transmission mode selected. CL1, L20-22: the TDMA technique divides time into frames of fixed and predetermined duration, the frames being in turn divided into time slots; each call is associated with one or more time slots; CL10, L63-64: a quality indicator is determined regularly. This implies that the quality determination will be made at **regular time intervals**. Since time is divided into frames in the TDMA system, then quality measurement can also be made at intervals of specified frame times, for example for each n frames. If the quality measurement is made once every n frames, then the coding mode can be changed by the base transceiver station also only once every n frames. CL5, L20-22: a change of transmission mode to a transmission mode corresponding to a lesser amount of transmission resources; CL7, L16-18: selection of a coding mode is carried out such a manner as to limit the

quantity of resources allocated in each transmission direction. This implies that it is necessary to minimize resources required to transmit from the base transceiver station to the mobile station the coding mode selected for the uplink.

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Le Strat et al.** so that the transmission would be in a downlink of a communication system and the second type of control information would represent a coding mode to be applied in an uplink of the communication system because it would be necessary to minimize resources required to transmit the coding mode selected from the base transceiver station to the mobile station as described in the paragraph above and **Roberts et al.** would achieve that objective using one additional control bit (ninth bit) in the slot used for transmission of data. (**Roberts et al.** teaches at CL30, L28-41: each DS0 in the CTSU input has been modified by appending **a ninth bit** which can carry **multiframe timing, signaling information and control/status messages** (Fig. 9); the ninth bit signal (NSB) carries a pattern which is **updated each frame and repeats every 24 frames**; CL30, L42-49: the ninth bit signaling is a mechanism developed to carry the **multiframe timing**, out-of-band signaling bits and miscellaneous status and control information associated with each DS0 between DS1U and the channel units; CL98, L55-61: the rate adaptation (RA) unit is responsible for converting the 2.56 Mbps, 9 bit data format of the input to the 2.048Mbps, 8 bit data format in both the receive and transmit directions; in both directions the RA is responsible for managing any information that may be placed in the 9th bit; CL98, L62 to CL99, L1: the NBS is responsible for transmitting and receiving the data that is carried with each DS0 in the ninth bit; CL99, L40-45: in **the**

downstream direction, the NBS is used to enable data transmission; the processor will enable transmission by sending a data pattern over the downstream ninth bit of the first DS0 of a multi-channel call; Table 10 and CL10, L12-21: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the command information is sent in bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is extracted and assembled to get the commands; the idle sync command has a bit pattern of 0000 0000 0000 0000 and is used during idle time to synchronize the receivers; the data dial tone command has a bit pattern of 1000 0000 0000 0000 and is used to instruct the CDMs to enable transmission).

(10.1.10) <u>The Examiner does not explain what, in the references themselves, would teach one skilled in the art to substitute the coding mode/indications of transmission quality in Le Strat et al. for the control information/ninth bit signaling information described in Roberts et al.</u>

<u>Appellants' Arguments</u>

The Examiner cites Le Strat et al. for its description of transmitting coding modes in the uplink and a means for determining and transmitting at least one indication representative of transmission quality in the uplink. The Examiner does not explain what, in the references themselves, would teach one skilled in the art to substitute the coding mode/indications of transmission quality in Le Strat et al. for the control information/ninth bit signaling information described in Roberts et al. The Examiner has failed to make a *prima facie* case of obviousness based on the cited combination of references. Le Strat et al. clearly does not

disclose or suggest partitioning the second type of control information in the claimed manner and transmitting that information as recited in claim 24.

Examiner's response

The Examiner has explained in Paragraph 9.10 above and explains as follows what, in the references themselves, would teach one skilled in the art to substitute the coding mode/indications of transmission quality in Le Strat et al. for the control information/ninth bit signaling information described in Roberts et al.

Roberts et al. and **Paneth et al.** do not expressly teach that the transmission is in an uplink of a communication system and the first type of control information represents a coding mode applied in the uplink. **Le Strat et al.** teaches that the transmission is in an uplink of a communication system and the first type of control information represents a coding mode applied in the uplink (CL7, L6-8: the decision to change coding mode and/or transmission mode is taken in the base transceiver station; CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprise means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected; the base transceiver station selects the coding mode for the uplink from mobile station to the base transceiver station and communicates that to the mobile station. CL7, L43 and L49-50: a mobile station including means for receiving an indication representative of the coding/transmission mode selected. The actual coding mode for the uplink could be changed by the mobile station, at any time without prior knowledge of the base transceiver station. CL1, L20-22: the TDMA technique divides time into frames of fixed and predetermined duration, the frames being in

turn divided into time slots; each call is associated with one or more time slots. Therefore, when the base transceiver station receives a frame, it has no knowledge of if the code mode used is same as the previous one or it is some thing new. Therefore, the mobile station has to transmit to the base transceiver station in the uplink direction, the coding mode used with each frame).

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Le Strat et al.** so that the transmission would be in an uplink of a communication system and the first type of control information would represent a coding mode applied in the uplink because the mobile station would have to transmit to the base transceiver station in the uplink direction, the coding mode used with each frame as described in the paragraph above and **Roberts et al.** would come very handy for that. **Roberts et al.** teaches at CL35, L59-64: the ISU operations channel (IOC) transceiver of the CXMC contains transmit buffers to hold messages or **control data** and logic and loads this **control messages** ... to be provided to the MCC modem; CL37, L1-2: the multi-carrier modulation technique involves **encoding the telephony and control data**; CL37, L29-34: the multiframe clock conveys ... and **indicates the multi-carrier frame structure** so that the **telephony data may be correctly reassembled** at the ISU; CL37, L37-62: all ISUs will use the synchronization information inserted by the associated MCC modem to recover all downstream timing required by the ISUs; this synchronization allows the ISUs to **demodulate the downstream information and modulate the upstream information** in such a way that all ISU transmissions received at the HDT are synchronized to the same reference; CL39, L32-40: the MCC modem coordinates **the**

telephony information transport as well as control data transport for controlling the ISUs by the HDT; the control data may include **dynamic allocation and assignment messages**, ISU synchronization control messages, ISU modem control messages; CL41, L24-34: the spectrum assignment for one 6MHZ band for upstream and downstream transport of telephony information and control data ... has 240 payload channels, 24 IOC channels and 2 synchronization channels; CL41, L55-66: the telephony payload channels and the IOC channels of the 6MHZ band are **interspersed** in the telephony payload channels with the IOC channel located every 10 payload channels; with such a distributed technique, wherein sub-bands of payload channels greater than 10 include an IOC channel, the amount of bandwidth an ISU sees can be limited such that an IOC channel is available for the HDT to communicate with the ISU; Fig 13: shows the **IOC control data channels**, the payload data channels and the synchronization channels in a 6MHZ frame.

Le Strat et al. does not teach that the transmission is in an uplink of a communication system, the second type of control information representing a downlink quality measured in the downlink. However, **Le Strat et al.** teaches at CL7, L6-11 that the decision to change coding mode and/or transmission mode is taken in the base transceiver station; the mobile station transmitting to the base transceiver station information representative of transmission quality in the base transceiver station to the mobile station direction; CL7, L43-48: a mobile station including means for determining at least one indication of transmission quality in the base transceiver station to the mobile station direction and means for transmitting the indication to the base transceiver station. Therefore, the mobile station determines one indication of transmission quality in the base transceiver station to the mobile station direction and transmits

the indication to the base transceiver station; CL1, L20-22: the TDMA technique divides time into frames of fixed and predetermined duration, the frames being in turn divided into time slots; each call is associated with one or more time slots; CL10, L63-64: a quality indicator is determined regularly. This implies that the quality determination will be made at regular time intervals. Since time is divided into frames in the TDMA system, then quality measurement can also be made at intervals of specified frame times, for example for each n frames. CL5, L20-22: a change of transmission mode to a transmission mode corresponding to a lesser amount of transmission resources; CL7, L16-18: selection of a coding mode is carried out such a manner as to limit the quantity of resources allocated in each transmission direction. This implies that it is necessary to minimize resources required to transmit from the mobile station to the base transceiver station the indication of transmission quality.

It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to modify the method of **Roberts et al.** and **Paneth et al.** with the method of **Le Strat et al.** so that the transmission would be in an uplink of a communication system, the second type of control information would represent a downlink quality measured in the downlink because it would be necessary to minimize resources required to transmit from the mobile station to the base transceiver station the indication of transmission quality as described in the paragraph above and **Roberts et al.** would achieve that objective using one additional control bit (ninth bit) in the slot used for transmission of data. **Roberts et al.** teaches at CL30, L28-41: each DS0 in the CTSU input has been modified by appending **a ninth bit** which can carry **multiframe timing, signaling information and control/status messages** (Fig. 9); the ninth bit signal (NSB) carries a pattern which is **updated each frame and repeats**

every 24 frames; CL30, L42-49: the ninth bit signaling is a mechanism developed to carry the **multiframe timing**, out-of-band signaling bits and miscellaneous status and control information associated with each DS0 between DS1U and the channel units; CL98, L55-61: the rate adaptation (RA) unit is responsible for converting the 2.56 Mbps, 9 bit data format of the input to the 2.048Mbps, 8 bit data format in both the receive and transmit directions; in both directions the RA is responsible for managing any information that may be placed in the 9th bit; CL98, L62 to CL99, L1: the NBS is responsible for transmitting and receiving the data that is carried with each DS0 in the ninth bit; in **the upstream direction**, the ninth bit carries information regarding the ordering of data within a multi-channel call; the signaling consists of a repeating number that indicates which time position the DS0 occupies in the multi-channel; Table 9 and CL99, L31-39: there are **24 ninth bits** shown and described; these 24 bits are sent as ninth bits of DS0 in **24 successive frames**; the information is **repeated every 24 frames**; the ordering information of the channels is shown as bits 7 to 22; actually these are ninth bits sent in frames 7 to 22 of the multiframe; the information is extracted and assembled to get the byte value of the ordering information of the DS0 channel; This ordering information is used by the TSA to order the channels.

(10.1.11) <u>The Examiner does not explain how the cited combination of references would make it obvious to one skilled in the art to partition the coding information in one transmission link, transmit it in multiple frames, reform it on the receiving end and use the coding information to encode information for a different transmission link.</u>

Appellants' Arguments

Claim 29 is not obvious in view of the combination of Roberts et al. and Paneth et al. Neither reference describes receiving a code word that has been partitioned into sections among multiple consecutive frames and transmitted, and reforming that code word on receipt. In Le Strat et al., the received control information is not partitioned into sections and the control information is clearly not reformed. The Examiner does not explain what, in the references themselves, would teach one skilled in the art to substitute the coding mode in Le Strat et al. for the control information/ninth bit signaling information described in Roberts et al. Nor does the Examiner explain how the cited combination of references would make it obvious to one skilled in the art to partition the coding information in one transmission link, transmit it in multiple frames, reform it on the receiving end and use the coding information to encode information for a different transmission link.

Examiner's response

The Examiner explains as follows how the cited combination of references would make it obvious to one skilled in the art to partition the coding information in one transmission link, transmit it in multiple frames, reform it on the receiving end and use the coding information to encode information for a different transmission link.

Paragraph 10.1.9 describes how **Le Strat et al.** in combination with **Roberts et al.** and **Paneth et al.** teach that the transmission is in a downlink of a communication system and the second type of control information represents a coding mode to be applied in an uplink of the

communication system. It also teaches why the coding mode to be applied in the uplink direction will be partitioned into sections and transmitted in multiple frames.

Roberts et al. teaches on receipt of the multi-frames reforming the second type of control information into code word as described in Paragraph 10.1.3.

Roberts et al. also teaches encoding frames for transmission (CL36, L59 to CL37, L2: the MCC modem receives 256 DS0+ channels from the CXMC; the MCCC modem transmits this information to all the ISUs using multi-carrier modulation technique… the multi-carrier modulation technique involves encoding the telephony and control data; CL37, L27-34: incoming downstream information from CXMC to the MCC modem is frame aligned; … the multiframe clock conveys the channel correspondence and indicates the multi-carrier frame structure so that the telephony data may be correctly reassembled at the ISU).

Roberts et al. and **Paneth et al.** do not expressly teach encoding frames for transmission **depending on the reformed code word.** **Le Strat et al.** teaches encoding frames for transmission **depending on the received control information** (CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprise means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected; the base transceiver station selects the coding mode for the uplink from mobile station to the base transceiver station and communicates that to the mobile station. CL7, L43 and L49-50: a mobile station including means for receiving an indication representative of the coding/transmission mode selected; CL4, L60-61; a change of coding mode is necessary if the quality of channel deteriorates. As described in Paragraph 10.1.9 above, **Roberts et al., Paneth**

et al. and **Le Strat et al.** teach that the transmission is in a downlink of a communication system and the second type of control information represents a coding mode to be applied in an uplink of the communication system because it would be necessary to minimize resources required to transmit from the base transceiver station to the mobile station the coding mode selected for the uplink As described in Paragraph 10.1.3 above, **Roberts et al.** teaches reforming the second type of control information).

(10:1.12) In Le Strat et al. neither device partitions a code word into sections and distributes those sections among multiple frames for transmission

Appellants' Arguments

Neither reference describes a system in which a first device transmits a code word that has been partitioned into sections among multiple consecutive frames, and a second device receives and reforms that code word. In Le Strat et al. neither device partitions a code word into sections and distributes those sections among multiple frames for transmission.

Examiner's response

The Examiner agrees with the assertion that in Le Strat et al. neither device partitions a code word into sections and distributes those sections among multiple frames for transmission. As explained in Paragraphs 10.1 9 and 10.1.10, **Roberts et al.** teaches that both the service provider (HDT or base transceiver station) and the service receiver (ISUs or mobile station) partition a code word into sections and distribute those sections among multiple frames for

transmission. **Roberts et al.** and **Le Strat et al.** teach that the base transceiver station would partition the coding mode to be used in the uplink direction into sections and distribute those sections among multiple frames for transmission. The mobile station would partition the quality measurement into sections and distribute those sections among multiple frames for transmission to the base transceiver station.

(10.1.13) The Examiner has not identified what, from the references themselves, would cause one skilled in the art to substitute fixed and mobile devices described in Le Strat et al. for the fixed devices described in the primary references

Appellants' Arguments

The Examiner does not identify the first and second devices in Roberts et al. and Paneth et al. and why one skilled in the art would substitute the fixed and mobile devices described in Le Strat et al. for the devices disclosed in the primary references. It is not obvious to swap a fixed system such as described in Roberts et al. and Paneth et al. with a mobile system.

Examiner's response

The Examiner explains as follows what, from the references themselves, would cause one skilled in the art to substitute the fixed devices described in the primary references for the fixed and mobile devices described in Le Strat et al..

Roberts et al. teaches telephony signal transmission between the host digital terminal (HDT) and the home or multiple user integrated services unit (HISU or MISU) as shown in Fig.

1. The HDT contains the DS1U, CXMU, the MCC modem and the telephony transmitter and receiver as shown in Fig. 3. The HDT is the service provider and the ISUs are the service receiver. Figure 5 shows the optical distribution network between the HDT and the ISUs. The downstream is from HDT to ISU and the downstream video receiver and downstream telephony receivers handle the traffic from HDT to ISUs. The upstream is from ISUs to the HDT and the upstream telephony and set top control transmitters handle the traffic from the ISUs to the HDT. Therefore the downstream goes from the service provider to the service receiver and the upstream goes from the service receiver to the service provider.

Roberts et al. and **Paneth et al.** do not deal with mobile communication. Therefore, **Roberts et al.** and **Paneth et al.** do not expressly teach that the first device is a fixed part of the communication system and the second device is a mobile part of the communication system and there is an uplink established from the mobile part of the communication system to the fixed part of the communication system. **Le Strat et al.** teaches that the first device is a fixed part of the communication system (base transceiver station) and the second device is a mobile part of the communication system (mobile station) and there is an uplink established from the mobile part of the communication system to the fixed part of the communication system (CL3, L61-63: in this case the service provider is the base transceiver station and the service receiver is the mobile station). It would have been obvious to one of ordinary skill in the art at the time of the Applicants' invention to correlate the telephone signal transmission system of **Roberts et al.** and **Paneth et al.** with the mobile communication system of **Le Strat et al.** that included the first device being a fixed part of the communication system and the second device being a mobile part of the communication system and an uplink being established from the mobile part

of the communication system to the fixed part of the communication system. Then the HDT of the telephone signal transmission system would correspond to the base transceiver station of the mobile communication system; the ISUs would correspond to the mobile station; the downstream of the telephone signal transmission system would correspond to the down link of the mobile communication system and the upstream would correspond to the uplink.

(10.1.14) Dahlin does not mention partitioning control information (e.g., FACCH) and transmitting those sections in multiple frames

Appellants' Arguments

While Dahlin does teach that FACCH and SACCH information are encoded for transmission, Dahlin does not mention partitioning control information (e.g., FACCH) and transmitting those sections in multiple frames. Consequently, because none of the cited references disclose partitioning/sectioning/transmitting a second type of control information in the claimed manner, the Examiner has failed to make a prima facie case of obviousness based on the cited combination of references.

Examiner's response

The examiner agrees that Dahlin does not mention partitioning control information (e.g., FACCH) and transmitting those sections in multiple frames. The Examiner has shown clearly that **Roberts et al.** mentions partitioning control information and transmitting those sections in multiple frames as explained in Paragraph 10.1.1 above.

(10.1.15) The cited references therefore fail to disclose or suggest the frame formatting and interleaving step of claim 28

Appellants' Arguments

The Examiner contends that Dahlin (along with Paneth and Roberts et al.) teaches "frame formatting and interleaving the channel coded first type of control information, data and section of the second type of information." The Examiner cites only to specific portions of Roberts et al. that describe interleaving to support this argument. ... Roberts et al. generally, and these portions specifically, do not disclose or suggest partitioning a code word into sections. The cited references therefore fail to disclose or suggest the frame formatting and interleaving step of claim 28 in the context of a method in which a second type of control information comprising a code word is partitioned into sections and transmitted via multiple consecutive frames.

Examiner's response

Roberts et al. discloses partitioning a code word into sections and transmitting via multiple consecutive frames as described in Paragraph 10.1.1 above. **Roberts et al.** teaches frame formatting and interleaving the channel coded first type of control information, data and section of the second type of control information (CL30, L34-36: the modified DS0 is referred to as a DS0+; the ninth bit signal carries a pattern which is updated each frame and repeats every 24 frames; Fig 13; CL38, L33-34; CL41, L55-66: the telephony payload channels and

IOC channels are **interspersed** in the telephony payload channels with an IOC channel located every payload channels).

(10.1.16) Wan clearly does not disclose or suggest reforming a code word that has been sectioned among consecutive frames and transmitted

Appellants' Arguments

Claim 29 is not obvious in view of the combination of Roberts et al. and Paneth. Neither reference describes receiving a code word that has been partitioned into sections among multiple consecutive frames and transmitted, and reforming that code word on receipt. Wan does not disclose reforming a code word that has been sectioned among consecutive frames and transmitted. Wan does not teach partitioning a code word and distributing sections of the code word among consecutive frames of a multi-frame sequence.

Examiner's response

The Examiner agrees with the appellants that Wan does not disclose partitioning a code word and distributing sections of the code word among consecutive frames of a multi-frame sequence and reforming a code word that has been sectioned among consecutive frames and transmitted. However, Roberts et al. discloses partitioning a code word and distributing sections of the code word among consecutive frames of a multi-frame sequence as described in Paragraph 10.1.3 above. Roberts et al. discloses reforming a code word that has been sectioned among consecutive frames and transmitted as described in Paragraph 10.1.3 above.

(10.1.17) <u>The cited combination of reference do not teach decoding a received frames of a multi-frame sequence, each frame having a section of a code word.</u>

<u>Appellants' Arguments</u>

Claim 35 specifically recites that the second device is adapted to decode the frames of the multi-frame transmission using the first type of control information contained in a received frame. The Examiner contends that Wan's description of the step of decoding using a mode code derived from the first type of control information is sufficient, in and of itself, to render claim 35 obvious in view of the Roberts et al. /Paneth et al. combination of references. Wan does not disclose reforming a code word that has been sectioned among consecutive frames and transmitted. The cited combination of reference do not teach decoding received frames of a multi-frame sequence, each frame having a section of a code word.

<u>Examiner's response</u>

The Examiner directs the appellants' attention to the fact that claim 35 only requires that the second device is adapted to decode the frames of the multi-frame transmission using the first type of control information contained in a received frame. Claim 35 does not require reforming a code word that has been sectioned among consecutive frames and transmitted.

In addition, the Examiner takes the position that the cited combination of references teaches decoding received frames of a multi-frame sequence, each frame having a section of a code word. Wan teaches decoding using a mode code derived from the first type of control

information. Robert et al. teaches reforming a code word that has been sectioned among consecutive frames and transmitted as explained in Paragraph 10.1.4 above.

(10.1.18) Le Strat et al. does not disclose or suggest partitioning a coding word into sections and distributing each section among different, consecutive frames. Le Strat et al. does not disclose or suggest reforming the code word so partitioned.

Appellants' Arguments

Roberts et al., Paneth et al. and Wan to not expressly teach a transmission system with a second device that has an encoding means for data transmission that, in turn, uses a code mode based on the reformed control information and a transmission means for transmitting the data to the first device. The Examiner has not met the burden for establishing a prima facie case for obviousness of claim 36. Le Strat et al. does not disclose or suggest partitioning a coding word into sections and distributing each section among different, consecutive frames. Le Strat et al. does not disclose or suggest reforming the code word so partitioned. Le Strat et al. does not describe encoding using a reformed code word as required by claim 36. Therefore, the cited combination of references does not render obvious claim 36, in which the encoding means uses a code mode based on a reformed code word.

Examiner's response

The Examiner takes the position that Roberts et al. discloses partitioning a coding word into sections and distributing each section among different, consecutive frames as explained in Paragraph 10.1.1 above.

Roberts et al. teaches on receipt of the multi-frames reforming the second type of control information as described in Paragraph 10.1.3.

Roberts et al. also teaches encoding frames for transmission and transmission means for transmitting the encoded data to the first device (CL36, L59 to CL37, L2: the MCC modem receives 256 DS0+ channels from the CXMC; the MCCC modem transmits this information to all the ISUs using multi-carrier modulation technique… the multi-carrier modulation technique involves encoding the telephony and control data; CL37, L27-34: incoming downstream information from CXMC to the MCC modem is frame aligned; … the multiframe clock conveys the channel correspondence and indicates the multi-carrier frame structure so that the telephony data may be correctly reassembled at the ISU).

Roberts et al. and **Paneth et al.** do not expressly teach encoding frames for transmission **depending on the reformed code word. Le Strat et al.** teaches encoding frames for transmission **depending on the received control information** (CL7, L28-29 and L37-42; Fig. 9, Item 98: the base transceiver station comprise means for modifying the coding mode and/or transmission mode in each transmission direction and means for transmitting to the mobile station information representative of the coding/transmission mode selected; the base transceiver station selects the coding mode for the uplink from mobile station to the base transceiver station and communicates that to the mobile station. CL7, L43 and L49-50: a mobile station including means for receiving an indication representative of the

coding/transmission mode selected; CL4, L60-61; a change of coding mode is necessary if the quality of channel deteriorates. As described in Paragraph 10.1.9 above, **Roberts et al., Paneth et al.** and **Le Strat et al.** teach that the transmission is in a downlink of a communication system and the second type of control information represents a coding mode to be applied in an uplink of the communication system because it would be necessary to minimize resources required to transmit from the base transceiver station to the mobile station the coding mode selected for the uplink As described in Paragraph 10.1.3 above, **Roberts et al.** teaches reforming the second type of control information).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this Examiner's Answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

K. Thangavelu
Examiner
Art Unit 2123

Paul Rodriguez
Supervisory Patent Examiner
Art Unit 2123

Kamini Shah
Supervisory Patent Examiner
Art Unit 2128

June 23, 2006

Conferees
Paul Rodriguez
Kamini Shah